

**WETLAND INVENTORY UPDATE
YEAR 8 SYNTHESIS REPORT
2012**



January 2013
Water Resources Division
Lummi Natural Resources Department
Lummi Indian Business Council

LUMMI NATION

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2012

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1.0 INTRODUCTION

The Lummi Indian Reservation (Reservation) is located along the western boundary of Whatcom County, Washington and includes the mouth of the Nooksack and Lummi Rivers (Figure 1). Both the Nooksack and Lummi River Watersheds are under environmental pressures from rapid regional growth. The Lummi Nation has also entered a period of rapid economic development under self-governance. Growth on and near the Reservation requires that the Nation's core environmental program prioritize the development of a regulatory infrastructure that is technically sound, legally defensible, and administratively efficient and allows for growth while protecting tribal resources and the Reservation environment. This regulatory infrastructure supports both the tribal goal and the Environmental Protection Agency (EPA) policy of tribal self governance and recognition of sovereignty.

Previous EPA and other funding sources have supported the Lummi Nation's assessment of priority water resource needs and the identification of unmet needs. Environmental planning intended to protect the Nation's water resources has included development of a Storm Water Management Program (Lummi Water Resource Division [LWRD] 1998a, LWRD 2011b), a Wellhead Protection Program (LWRD 1997, LWRD 1998b, LWRD 2011c), a Wetland Management Program (LWRD 2000), a Non-Point Source Management Program (LWRD 2001, LWRD 2002), and Water Quality Standards for Surface Waters of the Lummi Indian Reservation (LWRD 2008). These programs are components of a comprehensive water resources management program (CWRMP) being developed and implemented pursuant to Lummi Indian Business Council (LIBC) resolutions No. 90-88 and No. 92-43.

In January 2004, the Lummi Nation Water Resources Protection Code (Title 17 of the Lummi Code of Laws [LCL]) was adopted. Based on a Reservation-wide wetland inventory completed in 1999 (Harper 1999) and as described in Chapter 17.06 (Stream and Wetland Management) of LCL Title 17, different types of wetlands that vary in their quality and importance occur on the Reservation. In order to establish appropriate levels of protection, pursuant to LCL Chapter 17.06 the Reservation wetlands must be classified into one of four categories. Lummi Administrative Regulation (LAR) 17 LAR 06 identifies methodologies to evaluate Reservation wetlands.

Category 1 wetlands are considered critical value wetlands that have a high and irreplaceable level of importance for fisheries, Lummi culture, and/or water quality on the Reservation. Category 2 wetlands are wetlands that do not meet the Category 1 criteria but are high value wetlands that perform important ecological or hydrologic functions. Category 3 wetlands provide a moderate level of functions and are often less diverse. Category 4 wetlands have minimum habitat value and are suitable for restoration or enhancement efforts.

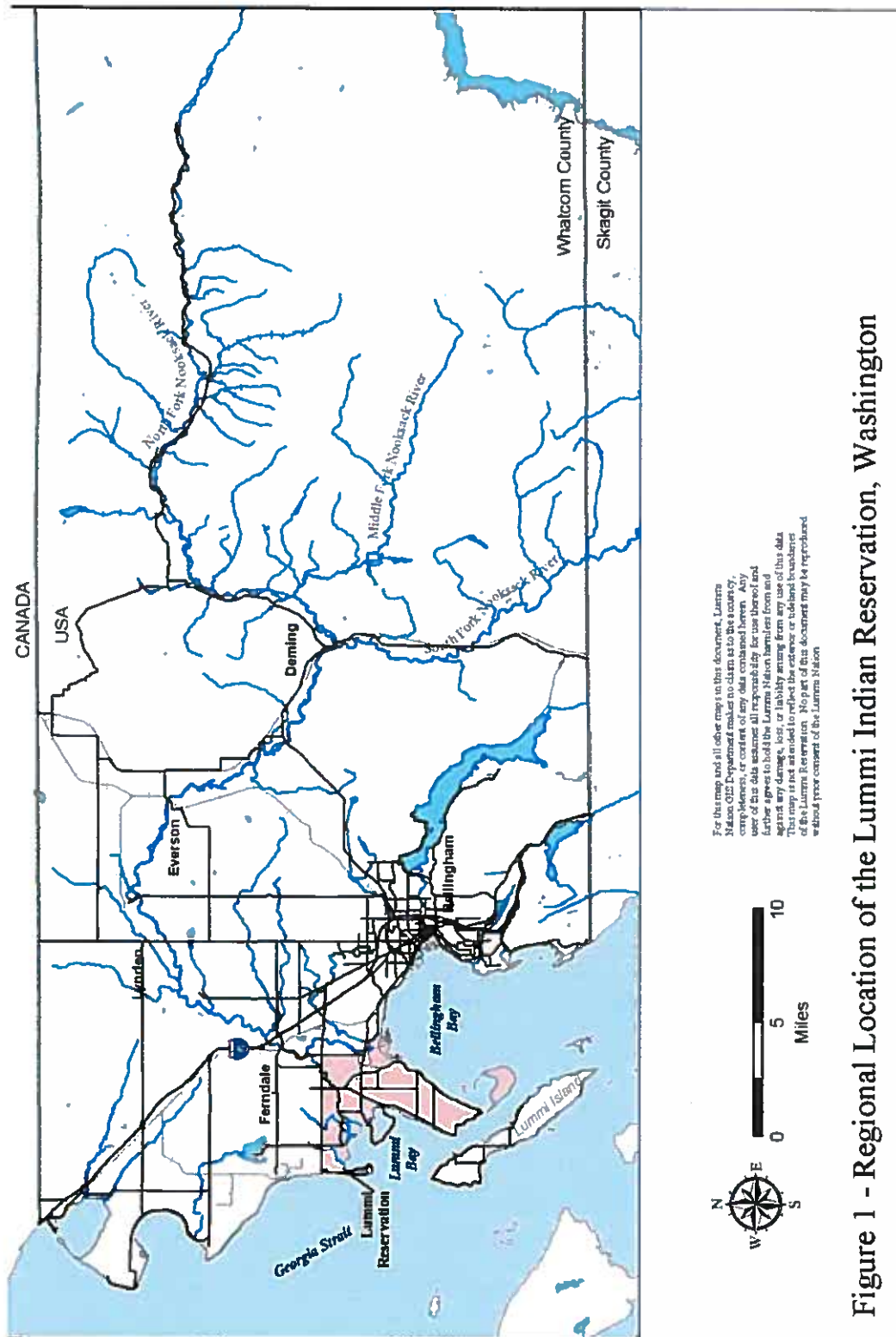


Figure 1 - Regional Location of the Lummi Indian Reservation, Washington

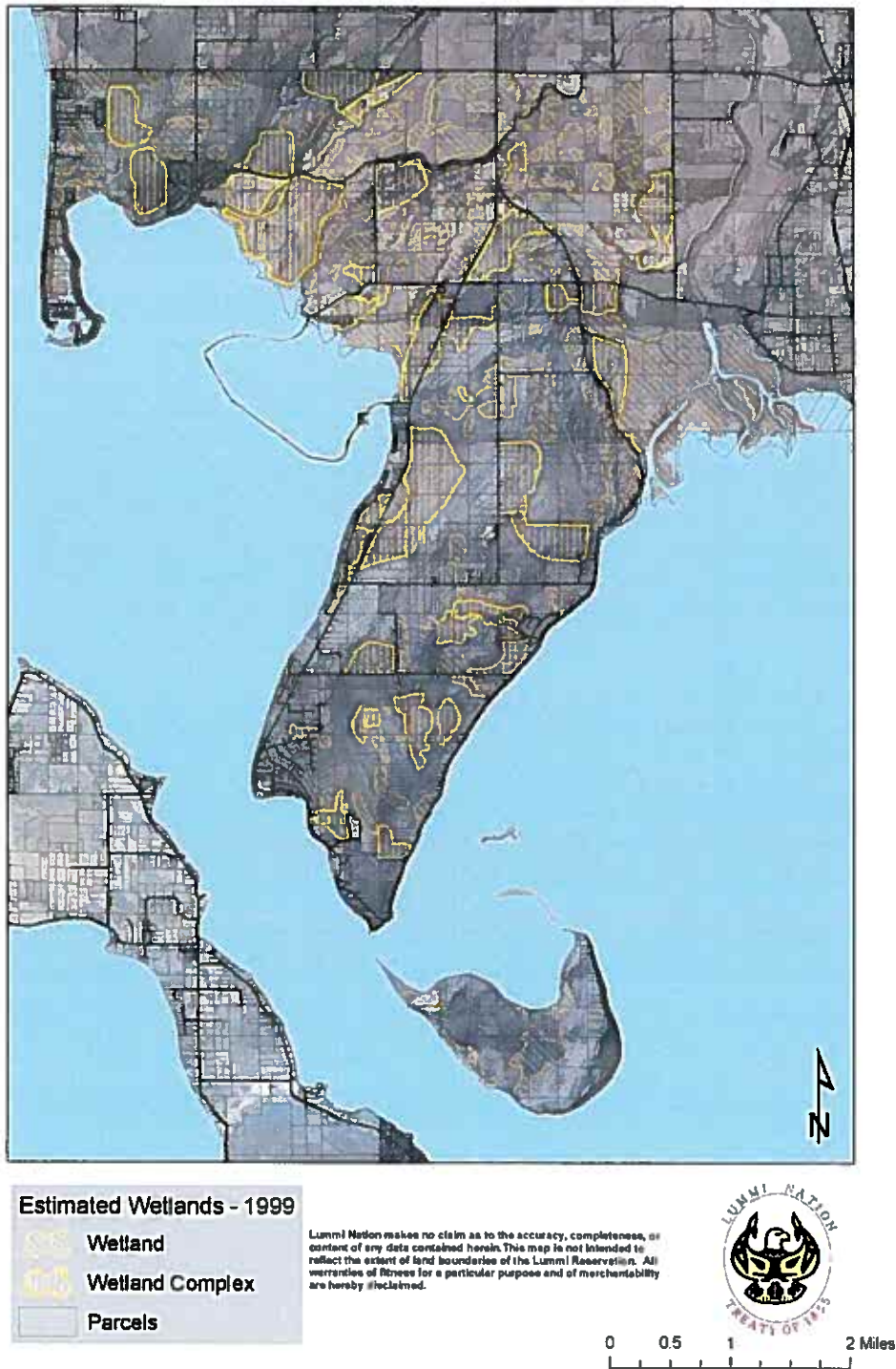
The purpose of the 1999 Reservation-wide wetland inventory was to identify wetland locations and to collect information on the characteristics and functions of the Reservation wetlands. The 1999 Reservation-wide wetland inventory (Harper 1999) relied largely on remotely sensed data (i.e., color and infra-red aerial photographs), generalized mapping (i.e., USDA soil survey), and limited field verification to identify wetland locations and sizes. In addition to identification and mapping, the 1999 inventory collected general wetland information including Cowardin classification (Cowardin et al. 1979), water source, and soil type. The Washington State Function Assessment Method (WFAM) was applied to 12 assessment units (AUs) in 9 selected wetlands on the Reservation. The 1999 inventory identified and mapped a total of 214 wetlands and wetland complexes on the Reservation (Figure 2). These wetland areas totaled 5,432 acres, or roughly 43 percent of the land area of the Reservation, excluding tidelands. Approximately 60 percent of these mapped wetland areas were located in the flood plains of the Lummi and Nooksack rivers.

Although the 1999 inventory represents an important planning tool and a significant improvement over the previously available information, which was largely from the National Wetlands Inventory (NWI) (USFWS 1987), the 1999 inventory has proven to be too general for many planning efforts. The 1999 inventory either did not map some wetlands or generally shows larger wetland areas than are surveyed in the field or identified using Global Positioning System (GPS) technology.

The inventory update effort is focused on refining the spatial resolution of wetland mapping, performing function assessments, and classifying the wetlands into the regulatory categories identified in Title 17. The wetland inventory update is intended to support efforts to protect these wetland resources and the important ecological, hydrological, and water quality protection functions they provide. Because of the large number of wetland areas on the Reservation, the effort to refine the spatial resolution of the wetland mapping, to perform function assessments, and to classify the Reservation wetlands was projected to require several years to complete.

Year 1 of the wetland inventory update effort was 2005. During the planning stages for this update effort, it was estimated that approximately 70 wetlands could be evaluated during one year (approximately three days per wetland). This estimate proved to be overly optimistic due to a number of factors including property access issues and the remoteness and size of some of the wetlands. There were also seasonal considerations including long periods of flooding, frozen ground, and snow that limited and/or prevented wetland boundary determination during portions of the winter season. During the summer season, mapping forested wetland areas is problematic because GPS satellite signals are often difficult to obtain through the dense tree canopy.

Figure 2 - 1999 Wetland Inventory Results



As described in more detail below, a wetland-consulting firm was contracted following Year 3 of the update effort to provide an independent program evaluation and quality assurance/quality control review. As a result of this evaluation and review, the functional assessment element of the wetland inventory update effort was deemphasized during Year 4. Since that time, functional assessments are deferred for wetlands until a development activity is imminent and the assessment is needed to determine appropriate mitigation measures for any unavoidable wetland impacts.

As a result of the independent program evaluation and review, starting in Year 4 (2008) the inventory update consists of conducting a site visit(s), performing a detailed reconnaissance-level delineation, using a mapping grade GPS unit to map the approximate location of the identified wetland boundaries, collecting representative data samples in wetland and upland locations, and classifying the wetlands into one of the four Lummi wetland categories.

This report summarizes the results of Year 8 of this inventory update effort. The results from Year 1 through Year 7 of the update effort are summarized in similar synthesis reports (LWRD 2005, LWRD 2006, LWRD 2007, LWRD 2009, LWRD 2010, LWRD 2011, and LWRD 2012). In total, 24 wetlands are identified as part of this Year 8 effort. When combined with the 217 wetlands identified during Year 1 through Year 7 of the inventory update, a total of 241 wetlands have been evaluated as part of the inventory update effort. This total is more than the 214 wetlands identified on the Reservation during the 1999 inventory. As described in more detail below, the increase in the number of wetlands is due to the more detailed fieldwork which resulted in the identification of additional wetlands and splitting of previous wetland polygons into more accurate smaller polygons. To date, the area covered in the inventory update is slightly less than 50 percent of the Reservation land (not including tidelands).

2.0 METHODS FOR WETLAND INVENTORY UPDATE

The methods used to update and refine the spatial resolution of the 1999 inventory are described below. Lummi Water Resources Division staff and consulting firms hired by the Lummi Planning Department, the Lummi Housing Authority, the Lummi Tribal Sewer and Water District, or the Lummi Natural Resources Department collected and interpreted the field data summarized in this Year 8 wetland inventory update report.

Three interrelated methods were used to update and refine the 1999 inventory. The different methods were used for wetland mapping/boundary determination, wetland rating/classification, and updating the Lummi Nation GIS wetland inventory/database.

2.1 Method for Wetland Mapping/Boundary Determination

Properties evaluated during the current inventory year were chosen based on development applications and/or potential for development. Because of property access issues and the remoteness and size of some of the Reservation wetlands, it is not practical to undertake a geography-based approach (i.e., watershed by watershed).

Instead, the parcels evaluated during this inventory update were based on areas with a high probability of development, areas being considered for purchase, areas where field conditions were appropriate for obtaining an accurate wetland boundary for the season, parcels for which Lummi Land Use Permit Applications were submitted to the Lummi Planning Department, and/or parcels where a development project has recently or is currently occurring.

In several cases, the inventory update was completed only within the confines of a single parcel or portion of a parcel. Many of these parcels were identified in the 1999 inventory as containing large wetlands or wetland complexes located over multiple contiguous parcels. Because acquiring landowner permission is time consuming, particularly for undivided parcels in trust status that may have in excess of 100 landowners, in many cases only a portion of the wetland was mapped. As a result, there are several wetlands and numerous fragments of wetlands that have been mapped by Lummi Water Resources Division staff during the last several years. Whenever possible, staff attempted to identify the wetland boundary to the limits of the parcel boundaries. These partial wetland areas are mapped and appear in Figure 3 and Figure 4. Completion of the updated wetland boundaries and classification/ratings has not yet been performed due to time constraints, adverse weather, and/or other reasons. These areas have been archived in the Lummi Nation Geographic Information System (GIS) so that work can continue on these wetlands and mapping, function assessments, and categorization can be finalized in the future as this wetland inventory update is completed.

Once a wetland from the 1999 inventory or a land parcel was selected for evaluation, the methodology used to reliably identify and map the wetland boundaries was as follows:

1. Prior to conducting a field visit, available remotely sensed data including high resolution aerial photography collected during 2004, 2008, and 2010 (approximately 0.5 feet resolution) and high-resolution (approximately ± 0.5 feet accuracy) topographic information acquired in 2005 using Light Detection and Ranging (LiDAR) technology were reviewed. Maps developed as part of the USDA soil survey for the area (USDA 1992) were also reviewed.
2. Information developed during the 1999 wetland inventory (if available), including watershed name and size, wetland size, Cowardin classes present, and USDA soil units in the vicinity were reviewed.
3. During the field visit(s), one of the following two methods for determining wetland boundaries was used:
 - Delineation Level Method. If development activities were planned that would potentially impact wetlands, or a jurisdictional determination of the wetland boundary was required, the wetland boundary was delineated in the field using the criteria and methodology from the *Corps of Engineers Wetland*

Delineation Manual (Environmental Laboratory, 1987) and in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (COE 2010). The manuals require examination of three parameters: vegetation, soils, and hydrology. This methodology requires evidence of at least one positive wetland indicator for each of the three parameters (vegetation, soils, and hydrology) to make a positive wetland determination. The specified criteria are mandatory and must all be present under normal environmental conditions. This method was used for wetlands that were adjacent to and associated with a development permit. These wetlands were typically delineated and surveyed by a professional surveyor, and computer aided design (CAD) data were provided to be incorporated into the Lummi GIS Database.

- **Reconnaissance Level Method.** If development activities were not planned, a "reconnaissance-level" investigation was conducted to identify the approximate wetland boundary. Although the reconnaissance level investigation was conducted with reasonable accuracy, it is less exact than a boundary identification made during a more detailed "delineation" of the precise boundary. Much more time would be required if a formal delineation and jurisdictional determination were made on all the wetlands due to additional data that would need to be acquired. For the reconnaissance level determinations, the same criteria was applied but in a less formal and detailed manner. The wetland boundaries were identified within approximately +/- 10 feet and were recorded using a handheld Trimble GeoXT GPS unit, and downloaded into the ArcMap10.1 GIS software program. The horizontal accuracy of the Trimble GeoXT GPS unit is ± 2 feet once the collected data are post-processed. In some cases, only a portion of the wetland edge was recorded using a GPS unit, and the rest of the wetland boundary estimated using a combination of other methods (e.g., aerial photography and LiDAR). In other cases, portions of the wetland boundaries were recorded using a combination of an on-the-ground reconnaissance, GPS data, soil mapping, LiDAR data, and recent aerial photography.

2.2 Method for Wetland Rating/Classification

Pursuant to the Lummi Water Resources Protection Code (LCL Title 17) and 17 LAR 06.030, the Washington State Department of Ecology's *Wetland Rating System for Western Washington – Revised* (Hruby, 2004) was used to classify all wetlands inventoried for this Year 8 effort.

The wetland classification system was designed to differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, the ability to replace them, and the functions they provide. The classification system results in rating wetlands into one of the following four categories:

- Category 1 wetlands are those that represent a unique or rare wetland type, or are more sensitive to disturbance than most wetlands, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime, or provide a high level of functions (scores > 70 points).
- Category 2 wetlands are difficult, though not impossible to replace, and provide high levels of some functions (scores between 51 – 69 points). These wetlands occur more commonly than Category 1 wetlands, but still need a relatively high level of protection.
- Category 3 wetlands provide a moderate level of functions (scores between 30 – 50 points). They have been disturbed in some ways, and are often less diverse or more isolated from other natural resources in the landscape than Category 2 wetlands.
- Category 4 wetlands have the lowest levels of functions (scores less than 30 points) and are often heavily disturbed. These are wetlands are most likely to be successfully replaced, and in most cases, improved. These wetlands may provide some important ecological functions, and also need to be protected.

The categories are intended to be the basis for wetland protection and management to reduce further loss of their value as a resource. Some decisions that can be made based on the rating include the width of buffers needed to protect the wetland from adjacent development, the mitigation ratios needed to compensate for impacts to the wetland, and permitted uses in the wetland. The wetland categorization or rating is the basis for determining the size of wetland buffers on the Reservation (LCL Title 17).

As a component of the rating process, a classification key was used to determine whether the wetland was riverine, depressionnal, slope, lake-fringe, tidal fringe, or tidal flats according to the hydrogeomorphic (HGM) classification system.

2.3 Method for Updating the Lummi Nation GIS Wetland Inventory/Database

As described in Section 2.1, the updated wetland boundaries were recorded by either a land survey or by using a mapping-grade Trimble GeoXT GPS unit. All information was entered into ArcMap10.1 GIS software. Once entered into the GIS, any newly identified wetland areas were assigned an identification number corresponding to the update year. A new numbering system, started in Year 7, replaced the old numbering system that was started in 1999 and was based on the Public Land Survey System (Township, Range, and Section). The current numbering system is intended to avoid numbering problems inherent in the old system related to splitting, lumping, and adjusting boundaries previously identified in 1999. Other data that were entered into the GIS database for new wetlands included wetland area in acres and hectares, comments about location or other unique features of the wetland, wetland rating/classification, HGM classification, Cowardin classification, the date the wetland was mapped, and watershed name.

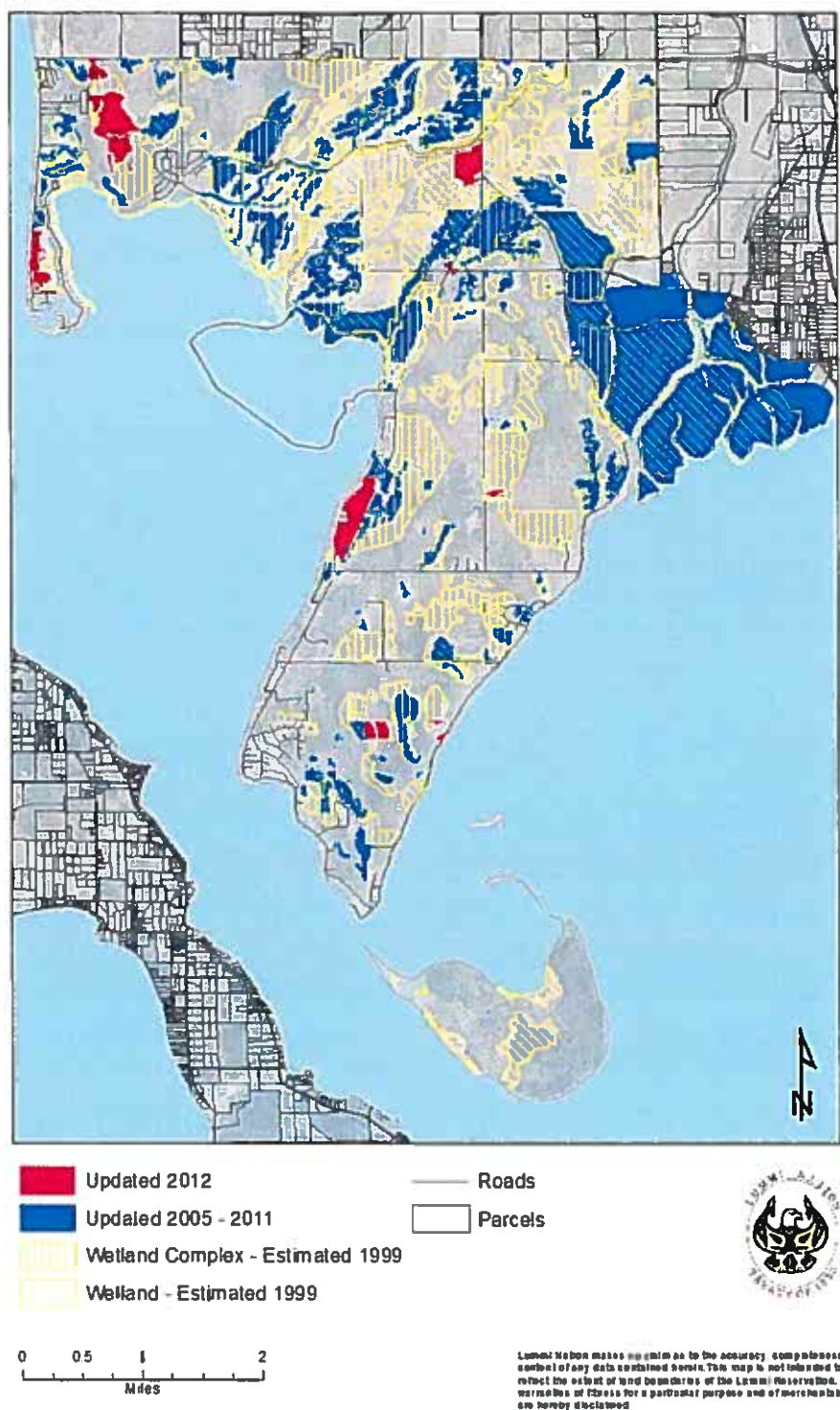
3.0 WETLAND INVENTORY UPDATE RESULTS

The Year 8 results are summarized below. Detailed field forms for the wetland areas are maintained on file at the Lummi Water Resources Division office. An example of the documentation is included as Appendix B.

3.1 Results of Wetland Mapping and Boundary Determination During 2012

A total of 24 wetland areas were identified on the Lummi Reservation in the Year 8 wetland inventory update effort (Figure 3). Detailed maps of each of these wetland areas are presented in Appendix A.

Figure 3 - Updated Wetland Boundaries and Estimated Wetland Locations



As summarized in Table 1, a total of approximately 224 acres of wetlands were mapped as part of the Year 8 update. A comparison of the wetland acreage mapped during the first seven years of this update effort is also summarized in Table 1.

Table 1. Comparison of Wetland Areas Evaluated by Program Year

Year	Number of Wetlands Evaluated	Evaluated Wetland Area (acres)
1 (2005)	36	1,413
2 (2006)	41	581
3 (2007)	20	380
4 (2008)	14	20
5 (2009)	48	127
6 (2010)	8	203
7 (2011)	50	269
8 (2012)	24	224
Total	241	3,217

The annual variations in the reported acreage of mapped wetlands are due to a number of factors including:

- The Year 1 Report summarized work that occurred over a period of almost 3 years.
- The Year 2 Report summarized work that occurred over a 1-year period.
- The Year 3 Report summarized work that occurred over a 9-month period with a reduced work week as the Water Resources Planner II worked only 32 hours a week starting in June 2006.
- The Year 4 Report summarizes work that occurred over an 11-month period that included a Quality Assurance/Quality Control effort with ESA Adolfson, a re-verification of some wetland boundaries by Douglass Consulting, and the reorganization of the Lummi Natural Resources Water Resources Division. This reorganization eliminated the Water Resources Planner II position and created a Water Resources Planner I position. The staff transition included an investment in formal training and practical/field applications with various wetland scientists, which reduced the amount of time available to advance the wetland inventory update effort.
- The Year 5 Report summarizes work that occurred over a 1-year period including work completed in conjunction with wetland contractors hired by the Lummi Planning Department, Lummi Housing Authority, or the Lummi Tribal Sewer and Water District.
- The Year 6 Report summarizes work that occurred over a 1-year period including work completed in conjunction with wetland contractors hired by the Lummi Planning Department, Lummi Housing Authority, or the Lummi Tribal Sewer and Water District. Although fewer wetlands were evaluated during Year 6 compared

to previous years, the acreage/area of the evaluated wetlands was greater than the wetland area evaluated during Year 4 and Year 5 combined.

- The Year 7 Report includes work that occurred over a period of several years. Thirty of the wetlands were updated in prior years but had not yet been formally incorporated into the inventory update. Twenty of the wetlands were original work done by a combination of LIBC staff and wetland consultants hired by the Lummi Planning Department, Lummi Housing Authority, and/or Lummi Natural Resources Department.
- The Year 8 Report summarizes work that occurred over a 1-year period including work completed in conjunction with wetland consultants hired by the Lummi Planning Department, Lummi Housing Authority, and/or Lummi Natural Resources Department.

Table 2 lists the 24 wetlands identified in the Year 8 wetland inventory update effort and their acreage. The identified wetlands are shown in Figure 3 and in higher resolution mapping included in Appendix A. Table 2 also compares the wetland acreage as determined during the Year 8 update and the wetland acreage from the 1999 inventory results. Eighteen (18) of the wetlands identified in Year 8 were not identified in the 1999 inventory, or the location or extent was not similar enough to the 1999 polygon to compare. Although the inventory update has only reviewed approximately 50 percent of the Reservation land, to date the wetland inventory update (Years 1 through 8) has identified a total of 125 wetland areas (296.40 acres) that were not identified in the 1999 inventory. Because the size of the inventoried wetlands have been more accurately determined as part of the update, in some cases the acreage has increased and in other cases the wetland acreage has decreased.

Table 2 – Wetland Size Comparison Results

Wetland ID Number	Watershed Identification	1999 Inventory Wetland Size (Acres)	Inventory Update Wetland Size (Acres)	Difference in Wetland Size (Acres)
2012-01	H, I	46	54.38	+8.38
2012-02	H	0 ¹	1.43	0
2012-03	K	0 ²	35.43	0
2012-04	R	0 ²	9.52	0
2012-05	Q	80*	58.04	-2.42*
2012-06	Q	0 ¹	0.50	0
2012-07	Q	80*	19.54	-2.42*
2012-08	Q	0 ¹	0.95	0
2012-09	I	0 ²	2.49	0
2012-10	I	0 ²	0.14	0
2012-11	E	0 ¹	0.03	0
2012-12	E	0 ²	1.39	0
2012-13	E	0 ¹	0.08	0
2012-14	E	0 ¹	0.06	0
2012-15	E	0 ¹	0.76	0
2012-16	E	0 ¹	0.02	0
2012-17	D	18	6.18	-11.82
2012-18	D	3.87	8.17	+4.3
2012-19	R	13.27	23.75	+10.48
2012-20	C	0 ¹	0.15	0
2012-21	K	0 ¹	0.25	0
2012-22	K	0 ¹	0.65	0
2012-23	K	0 ¹	0.01	0
2012-24	K	0 ¹	0.20	0
Total		161.14	224.12	+8.92

Notes:

¹ Wetlands not identified in the 1999 Inventory.

² The location and/or extent of the 2012 wetland is not similar enough to the 1999 polygon to compare.

* 2012-05 and 2012-07 together replace 80 acres of wetland identified in the 1999 Inventory. Together the two wetlands are 77.58 acres so there is a net decrease in 2.42 acres when compared to the 1999 size.

3.2 Results of Wetland Classification

Pursuant to 17 LAR 06.030, the *Washington State Wetland Rating System for Western Washington* (Hruby 2004) was applied to the 24 wetland areas evaluated in 2012. Table 4 presents a summary of the wetland rating and classification for wetlands evaluated during Year 8.

Table 4 – Wetland Rating and HGM Classification

Wetland ID Number	Watershed Identification	Wetland Rating	HGM Class
2012-01	H, I	III	Depressional
2012-02	H	III	Depressional
2012-03	K	III	Depressional
2012-04	R	III	Depressional
2012-05	Q	III	Depressional
2012-06	Q	III	Depressional
2012-07	Q	III	Depressional
2012-08	Q	III	Depressional
2012-09	I	II	Depressional
2012-10	I	III	Depressional
2012-11	E	III	Depressional
2012-12	E	II	Depressional
2012-13	E	III	Depressional
2012-14	E	III	Depressional
2012-15	E	III	Depressional
2012-16	E	III	Depressional
2012-17	D	III	Depressional
2012-18	D	II	Depressional
2012-19	R	III	Depressional
2012-20	C	III	Depressional
2012-21	K	III	Depressional
2012-22	K	IV	Depressional
2012-23	K	III	Depressional
2012-24	K	II	Depressional

Of the wetlands evaluated during Year 8, no wetlands were rated as Category 1, four wetlands were rated as Category 2, 19 were rated as Category 3 wetlands, and one wetland was rated as Category 4.

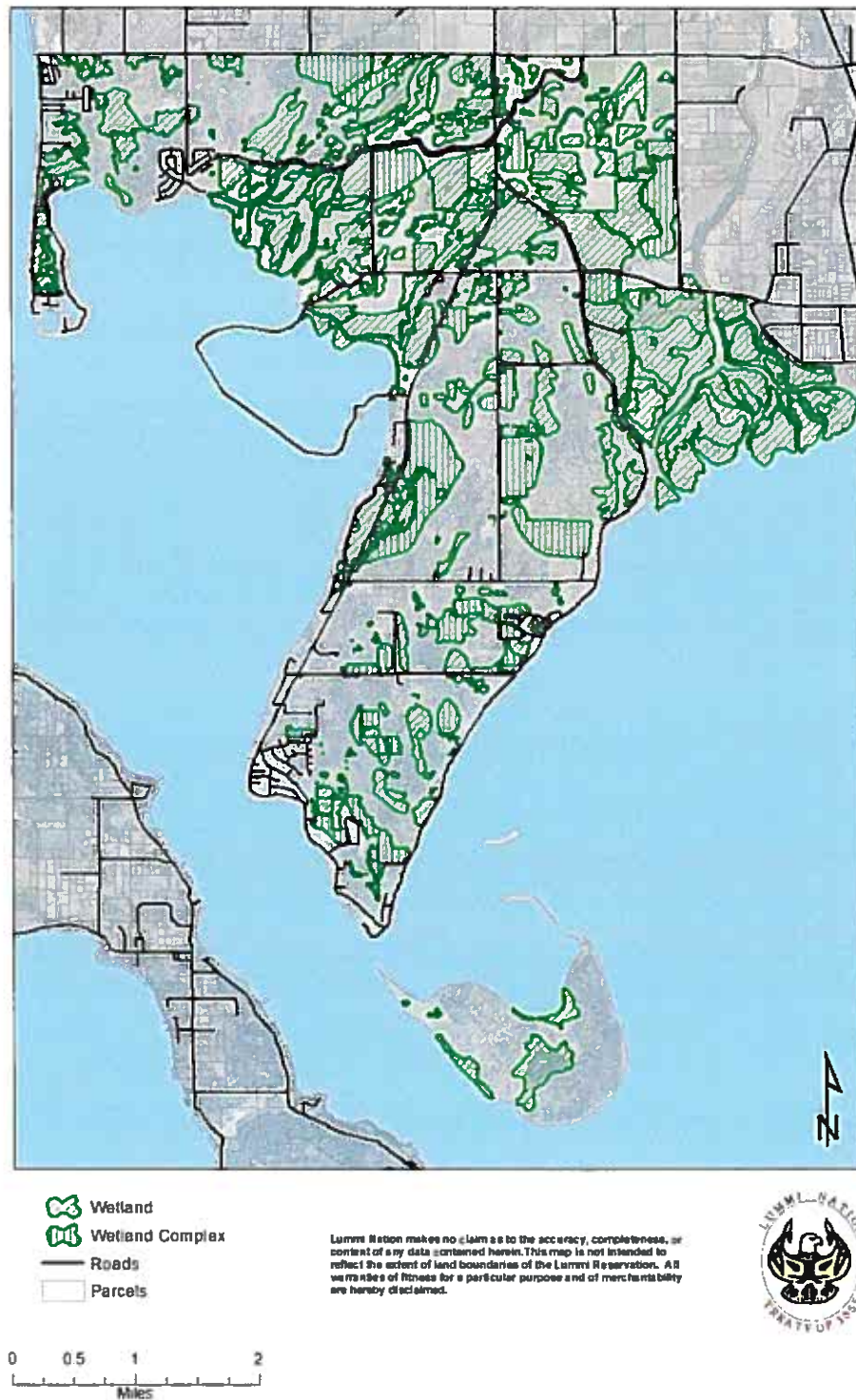
4.0 SUMMARY

Accurate information on wetland locations, extent, wetland category, and wetland functions is needed to effectively manage Reservation wetlands pursuant to the Lummi Nation Water Resources Protection Code (LCL Title 17) and associated Lummi Administrative Regulations. Although the 1999 inventory represents an important planning tool and a significant improvement over the previously available information, it has proven to be too general for many planning efforts. Refining the spatial resolution of the wetland mapping and classifying the wetlands into the regulatory categories identified in Title 17 is intended to support efforts to protect these wetland resources and the important ecological, hydrological, and water quality protection functions that they provide. Because of the large number of wetland areas on the Reservation, the effort to refine the spatial resolution of the wetland mapping and to classify the Reservation wetlands is projected to require several years to complete. This report summarizes the results of Year 8 of this inventory update effort.

The overall result of the inventory update effort will be a more accurate GIS data layer and an associated database that contains the Category and other summary information about each wetland on the Reservation. Hard copies of field notes (e.g., wetland rating worksheets, data, location maps) are maintained in binders in the Lummi Water Resources Division office. Until the update effort is completed, the GIS data layer and associated database will be a work in progress. The current version of the Lummi Reservation Wetland Map is shown in Figure 4. Figure 4 shows the information in Figure 3 except that the 1999 wetland locations were removed where more accurate information was available from the Year 1 through Year 8 inventory updates. Figure 4 is intended to reflect the best available information on Reservation wetlands to date. Based on the changes to the spatial locations and the utility of the collected information on wetland function and category, the inventory update is recommended to continue until it is completed.

As described previously, Year 8 of this inventory update resulted in revising the locations and extent of 24 wetland areas and classifying the wetlands into one of four categories. At the end of Year 8 of this update effort, a total of 241 wetland areas were evaluated, encompassing approximately 50 percent of the Reservation land (not including tidelands). A total of 214 wetland areas were identified as part of the 1999 Reservation-wide inventory. However many of the wetlands reported in the inventory update were either not identified in the 1999 inventory or are portions of larger wetland areas identified during the 1999 inventory.

Figure 4 - Best Available Wetland Inventory Map (December 2012)



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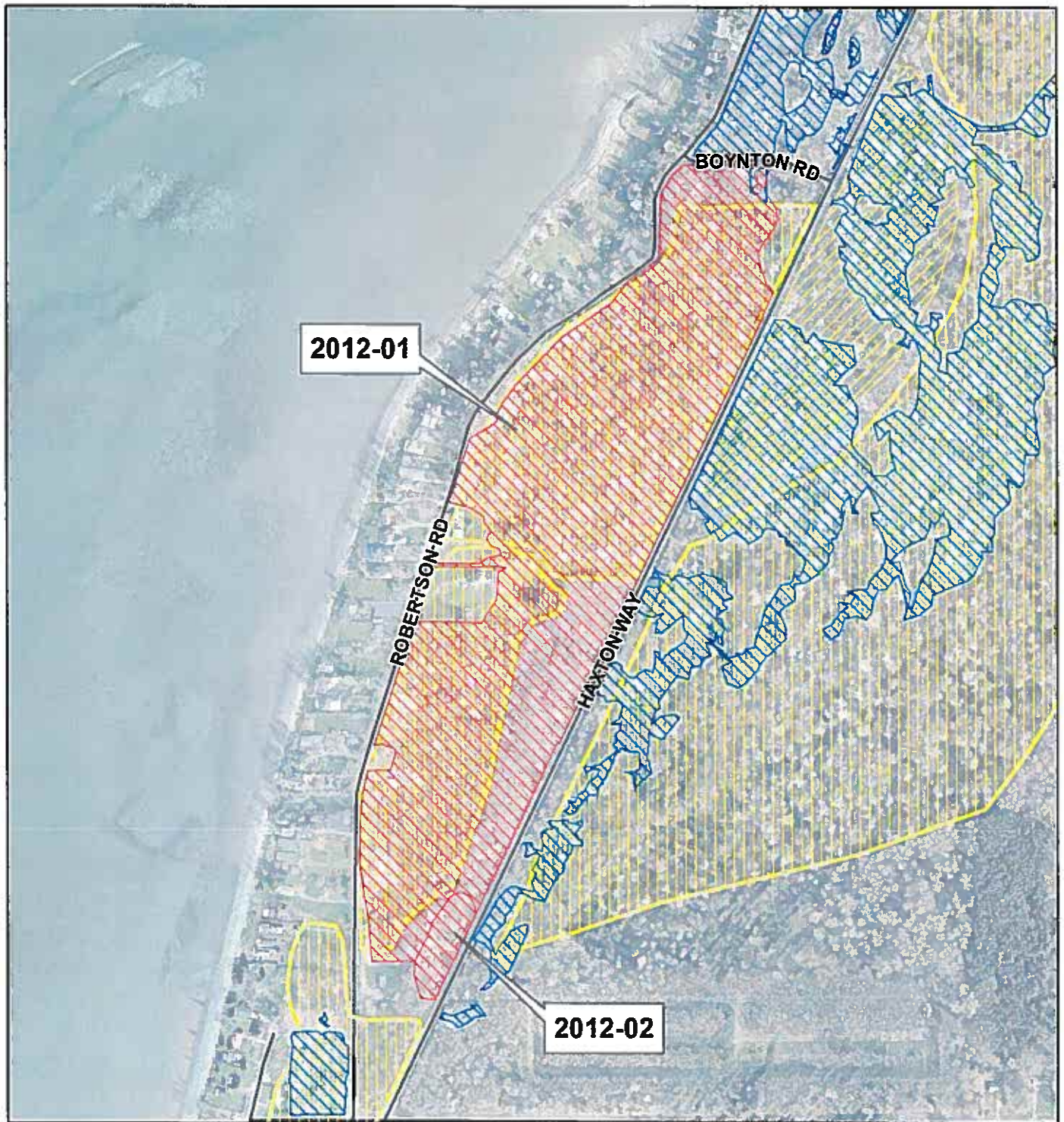
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APPENDIX A – INDIVIDUAL WETLAND MAPS

2012-01 and 2012-02



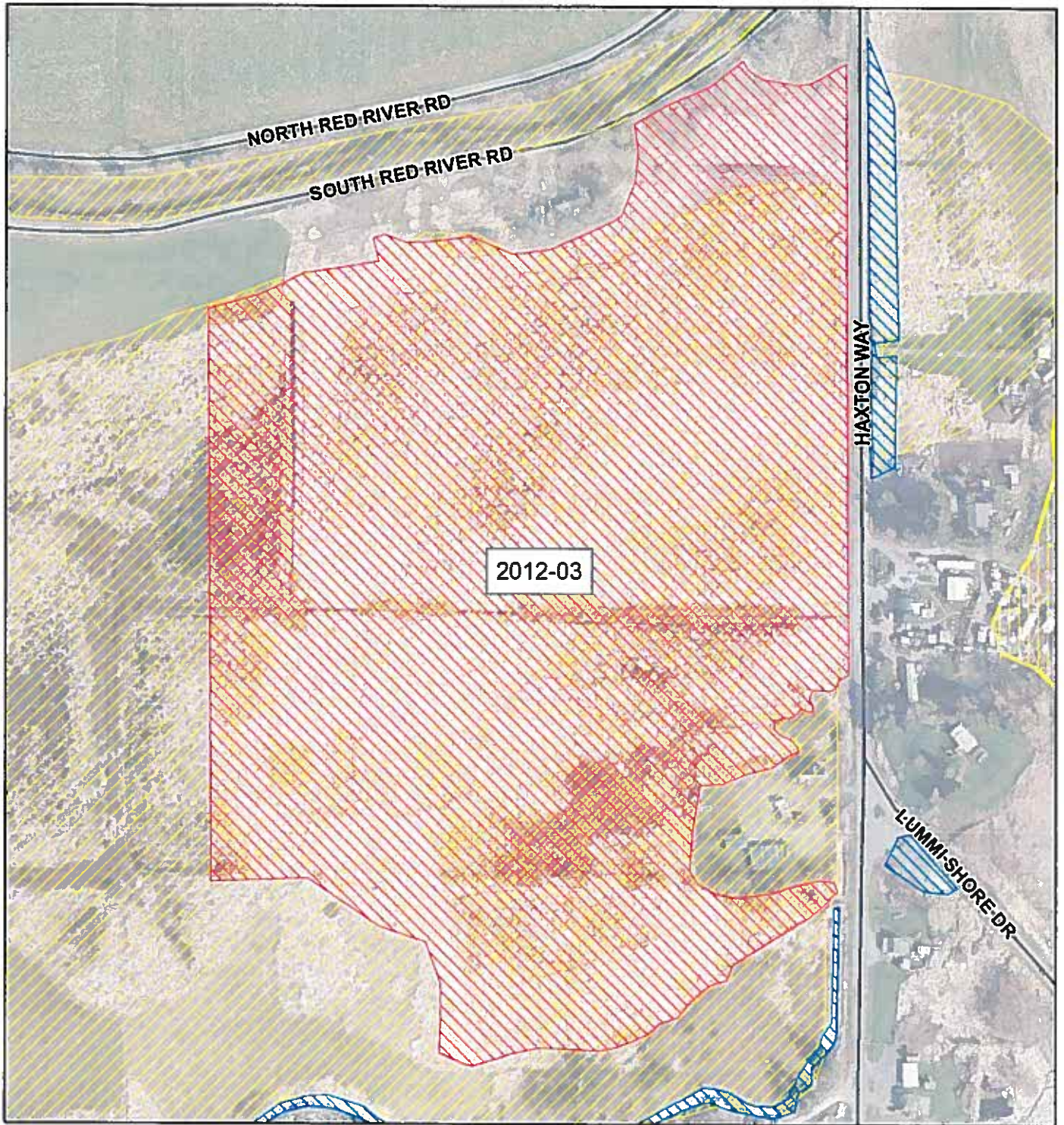
-  Field Verified 2012
-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)

-  Roads
-  Lummi Reservation



0 300 600
Feet



2012-03



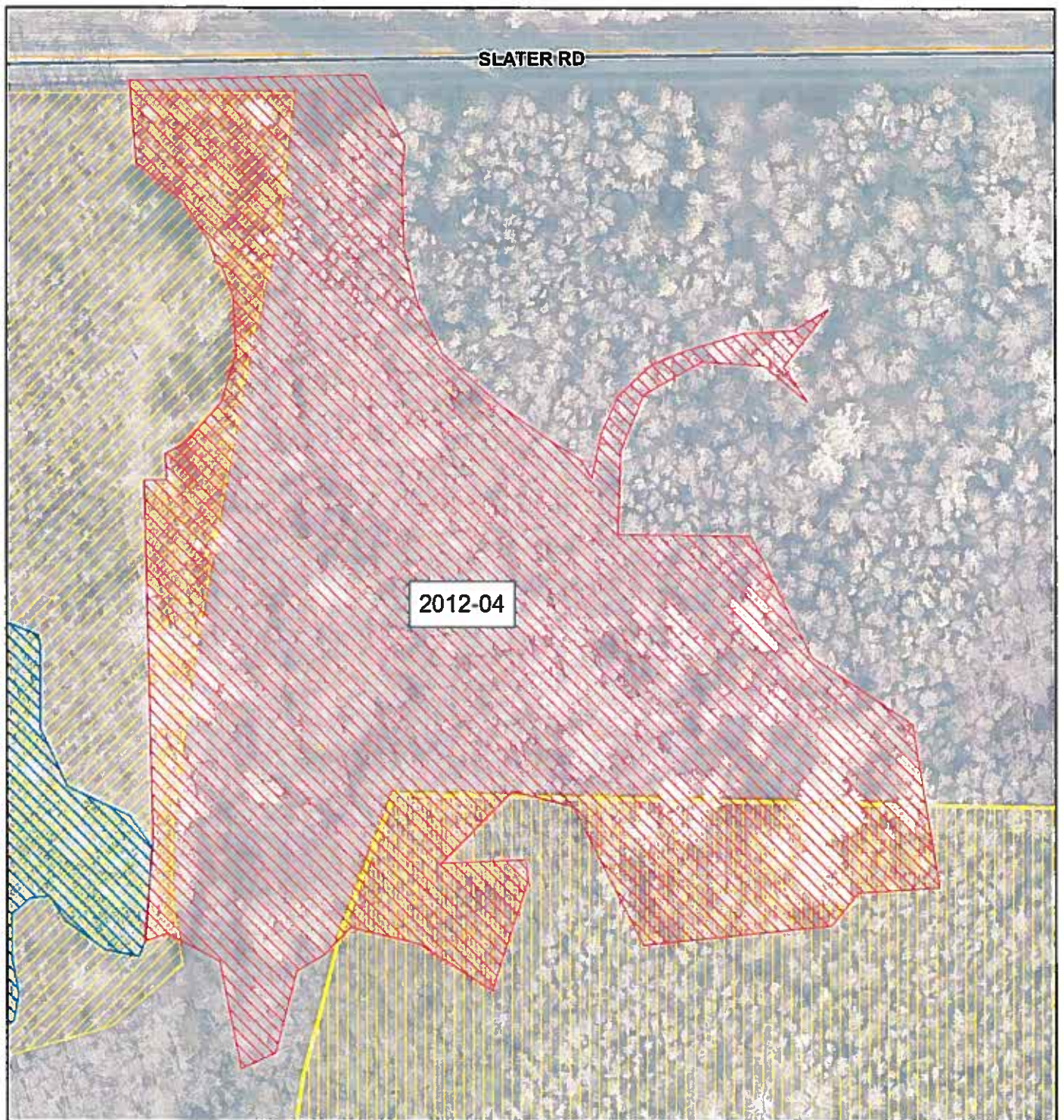
-  Field Verified 2012
-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)

-  Roads
-  Lummi Reservation



0 300 600
Feet



2012-04



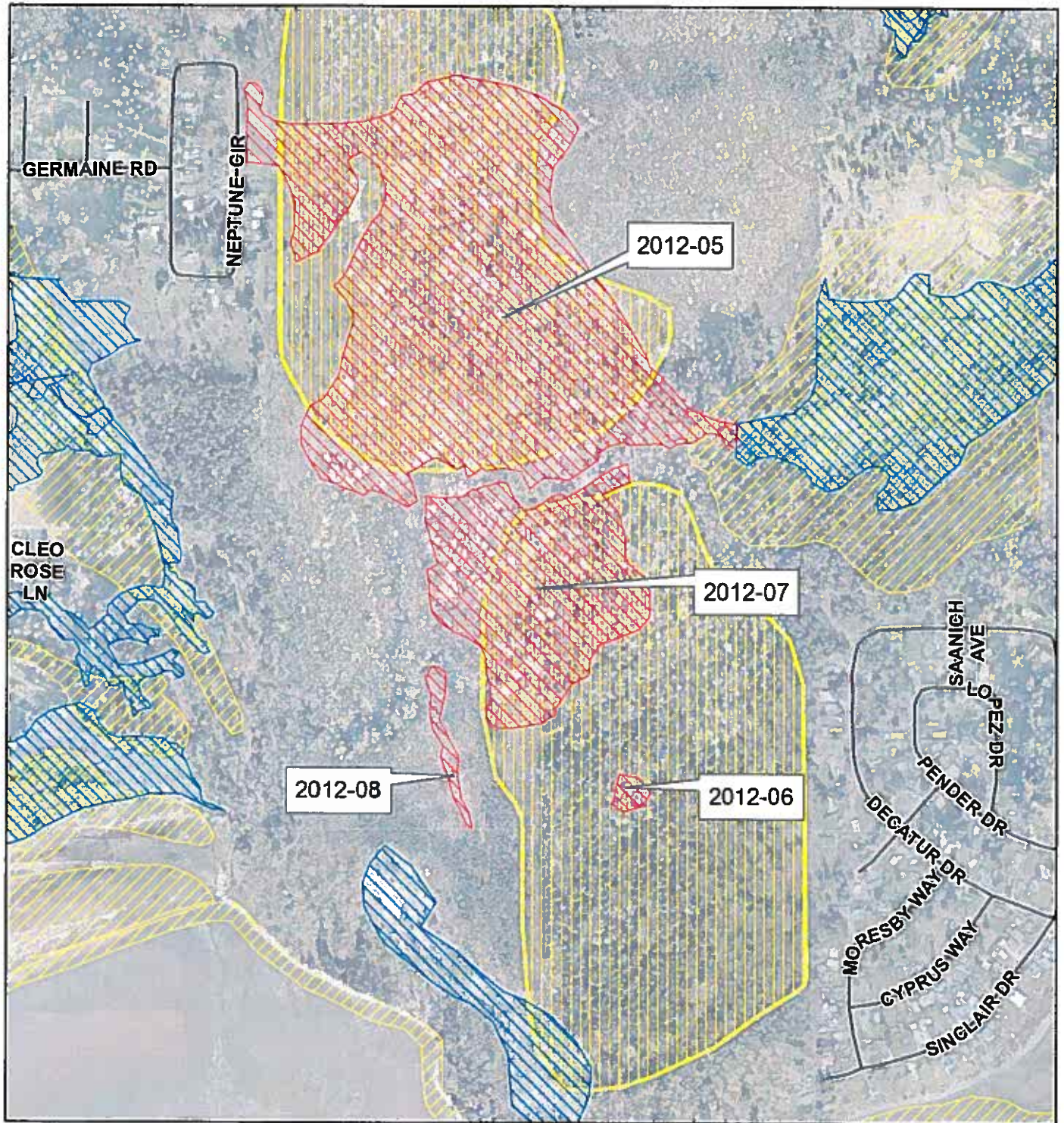
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-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)

-  Roads
-  Lummi Reservation

0 300 600
Feet



2012-05, 2012-06, 2012-07, and 2012-08

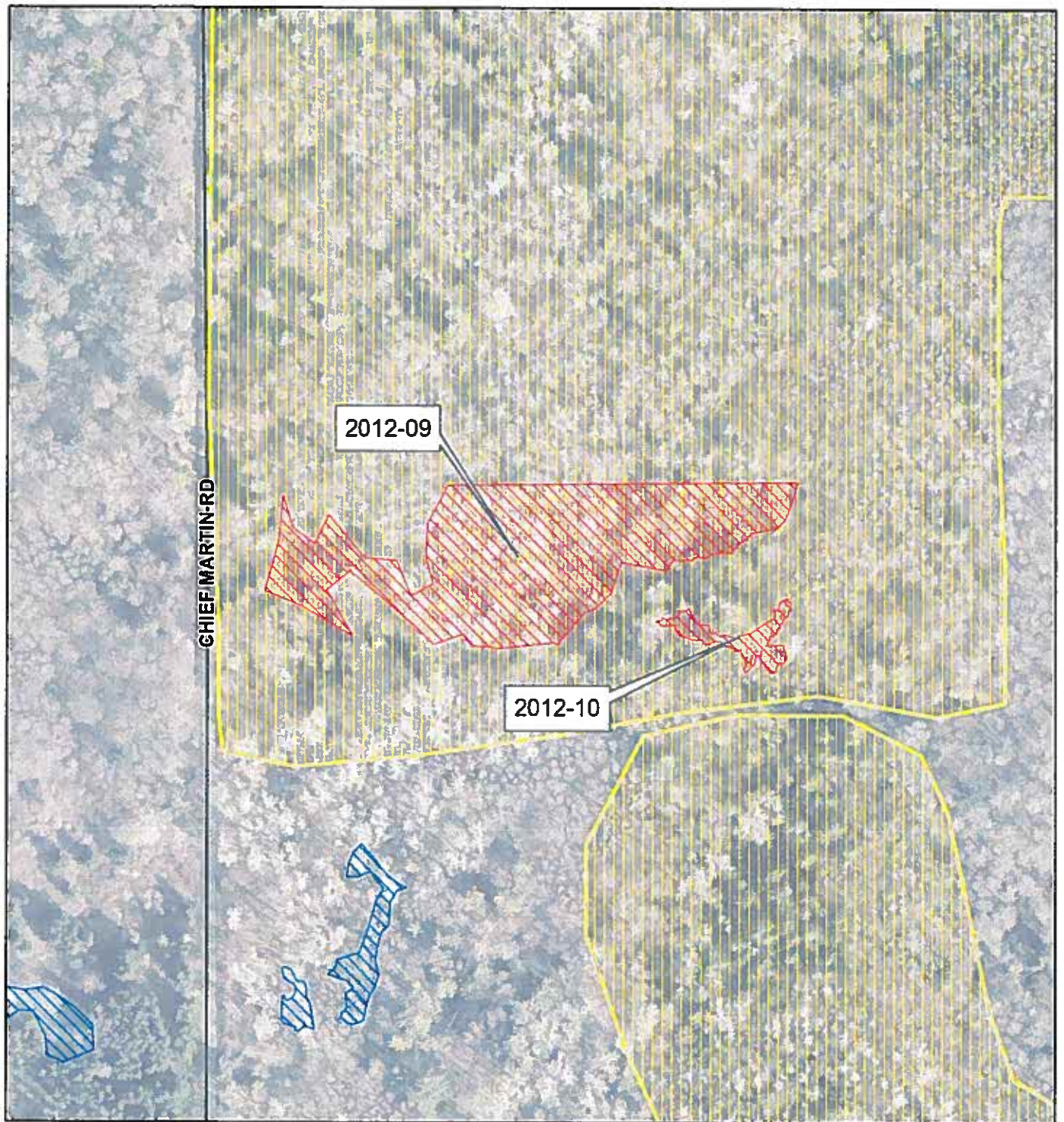


-  Field Verified 2012
-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)
-  Roads
-  Lummi Reservation

0 300 600
Feet



2012-09 and 2012-10

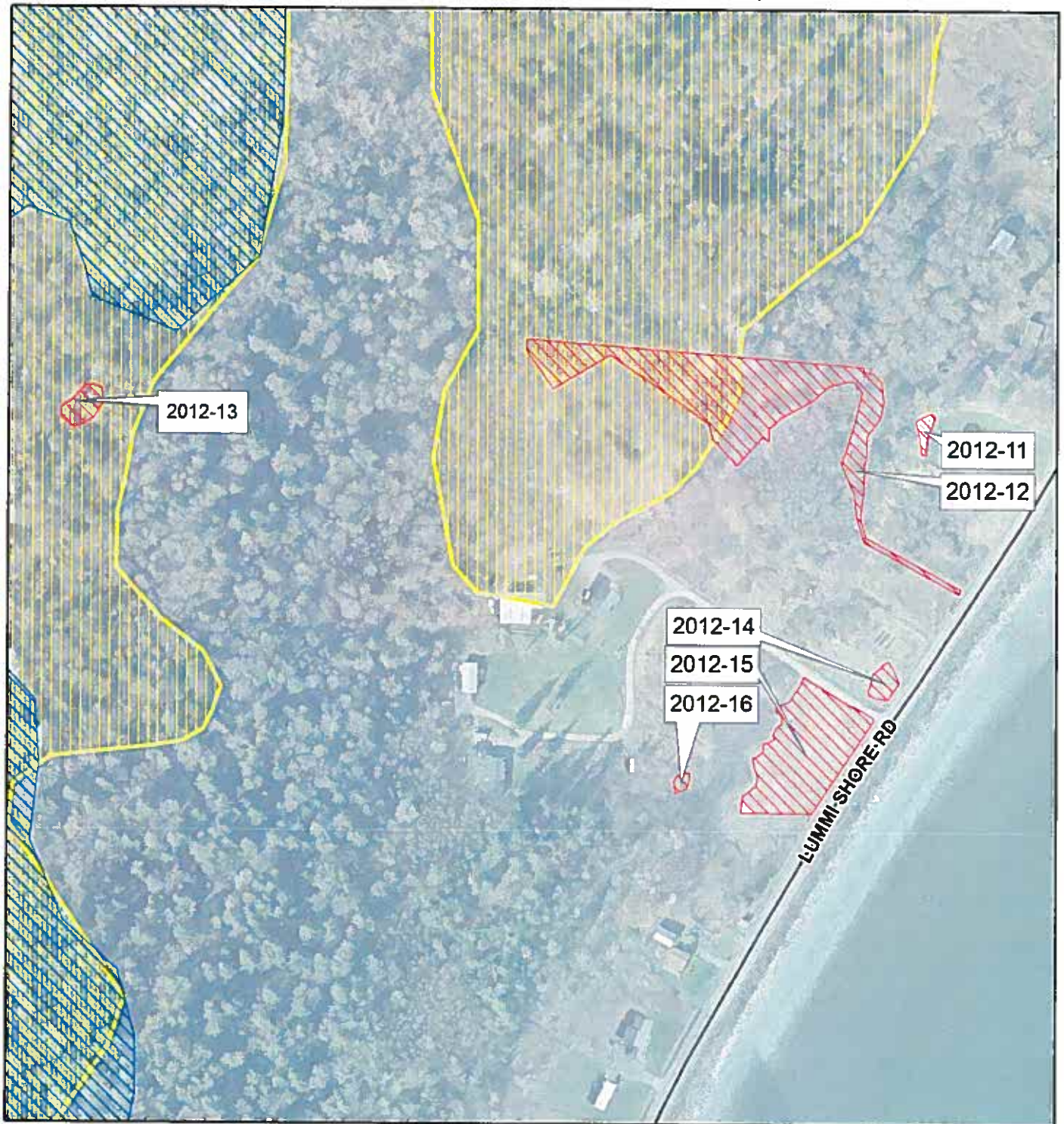


-  Field Verified 2012
-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)
-  Roads
-  Lummi Reservation



0 300 600
Feet



2012-11, 2012-12, 2012-13, 2012-14, 2012-15, and 2012-16



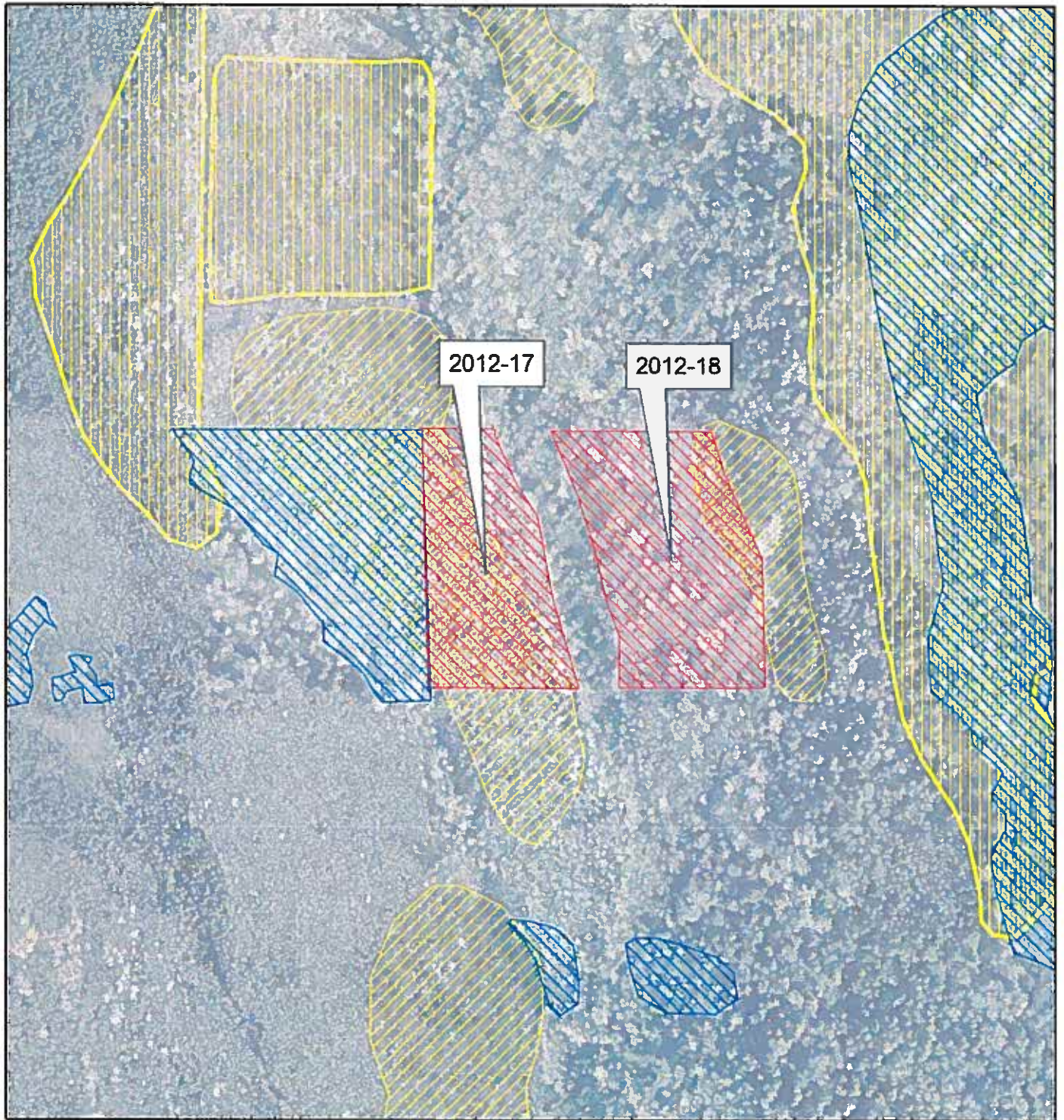
-  Field Verified 2012
-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)

-  Roads
-  Lummi Reservation

0 300 600
Feet



2012-17 and 2012-18



-  Field Verified 2012
-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)
-  Roads
-  Lummi Reservation



0 300 600
Feet



2012-19



-  Field Verified 2012
-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)

-  Roads
-  Lummi Reservation

0 300 600
Feet



2012-20

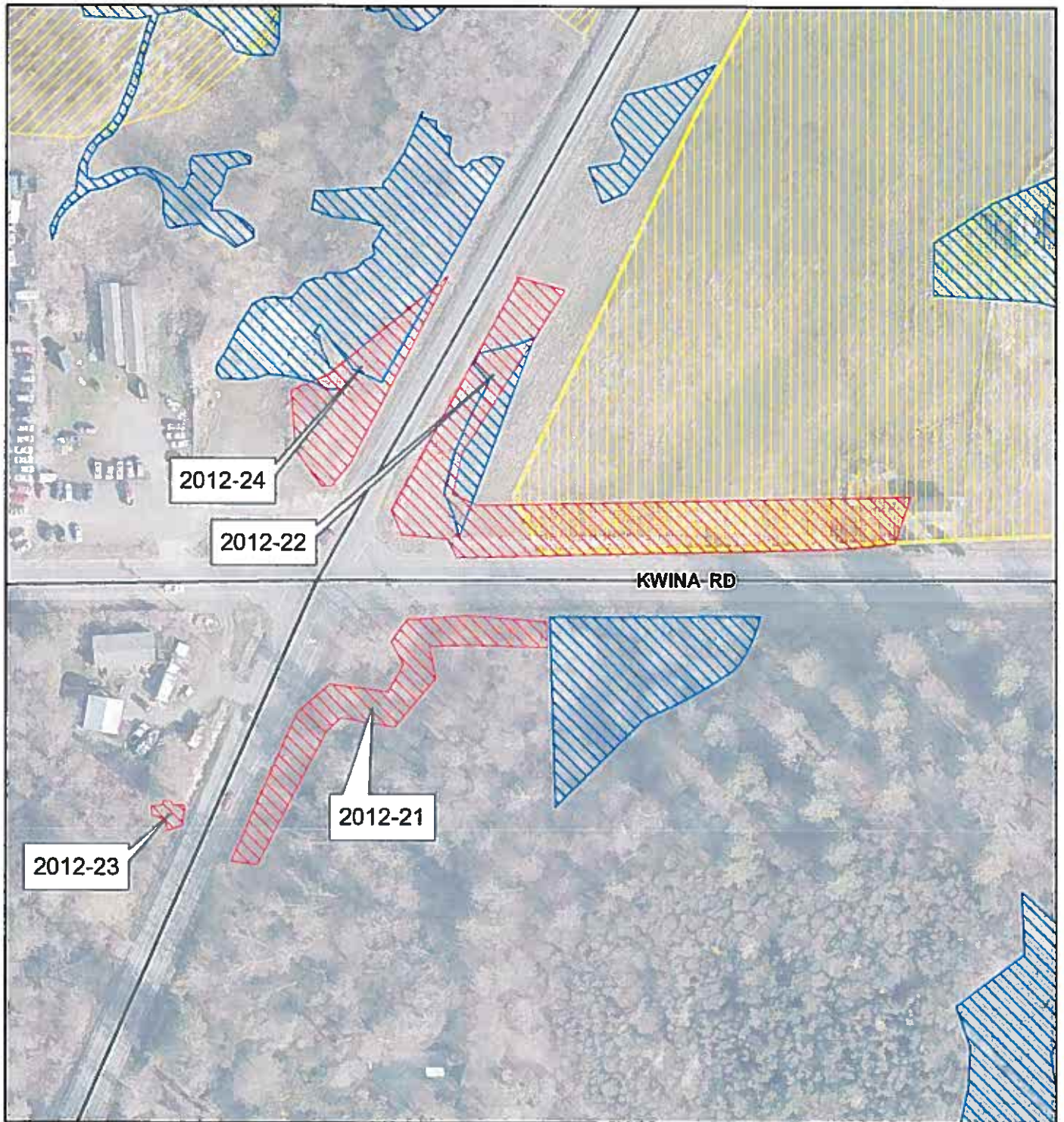


-  Field Verified 2012
-  Field Verified 2000-2011
-  Wetland (Estimated 1999)
-  Wetland Complex (Estimated 1999)
-  Roads
-  Lummi Reservation

0 300 600
Feet



2012-21, 2012-22, 2012-23 and 2012-24



- Field Verified 2012
- Field Verified 2000-2011
- Wetland (Estimated 1999)
- Wetland Complex (Estimated 1999)
- Roads
- Lummi Reservation

0 300 600
Feet



APPENDIX B – SAMPLE OF WETLAND RATING WORKSHEETS

Wetland Rating Field Data Form- Western Washington

Background Information: Lummi Nation Inventory, Wetland 2012-3

Name of Rater: Bodtke, Burns Affiliation: NW Ecological

Date of site visit: 1/31/2012

Name of Wetland (if known): 2012-3

Government Jurisdiction of Wetland: Lummi Nation, Army Corps of Engineers, EPA

Location (attach map with outline of wetland to rating form):

¼Section:

Section: 1 & 12
Range: 1E

Township: 38N

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: I ☐ II ☐ III ☒ IV ☐

Category I = Score >70

Category II = Score 51-69

Category III = Score 30-50

Category IV = Score < 30

Score for Water Quality Functions

22

Score for Hydrologic Functions

16

Score for Habitat Functions

11

TOTAL score for Functions

49

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ III ☐ Does not apply ☒

Final Category (choose the "highest" category from above)

III

Check the appropriate type and class of wetland being rated.

WETLAND TYPE

WETLAND CLASS

Estuarine

☐

Depressional

☒

Natural Heritage Wetland

☐

Riverine

☐

Bog

☐

Lake-fringe

☐

Mature Forest

☐

Slope

☐

Old Growth Forest

☐

Flats

☐

Coastal Lagoon

☐

Freshwater Tidal

☐

None of the Above

☐

Does the wetland being rated meet any of the criteria below?


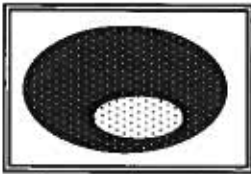
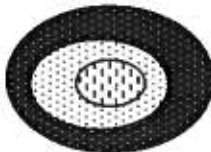




If the answer to any of the questions below is YES than the wetland will need to be protected according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
SP1. <i>Has the wetland been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database. <u>Assumed possible fish presence and connection t the Red River, however further investigation would be necessary to confirm – which wasn't done during this survey work.</u>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP2. <i>Has the wetland been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purpose of this rating system, "documented" means the wetland is on the appropriate state database. <u>Assumed possible fish presence and connection t the Red River, however further investigation would be necessary to confirm – which wasn't done during this survey work.</u>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP3. <i>Does the wetland contain individuals of Priority species listed by the WDFW for the state?</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP4. <i>Does the wetland have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DEPRESSIONAL AND FLATS WETLANDS		Points
Water Quality Functions – Indicators that wetland functions to improve the water quality.		
D1 Does the wetland unit have the <u>potential</u> to improve water quality?		-----
D1.1 Characteristics of surface water which flows out of the wetland: <input type="checkbox"/> Unit is a depression with no surface water leaving it (no outlet) 3 pts <input checked="" type="checkbox"/> Unit has intermittently flowing, or highly constricted permanently flowing outlet 2 pts <input type="checkbox"/> Unit has an un-constricted, or slightly constricted, surface outlet (permanently flowing) 1 pt <input type="checkbox"/> Unit is a flat depression (Q.7), or in the Flats class, with permanent surface outflow and no obvious natural outlet and/or outlet is a man-made ditch 1 pt <i>(If ditch is not permanently flowing, treat unit as intermittently flowing)</i>		2
D1.2 The soil two inches below the surface (or duff layer) is clay or organic (use NRCS definitions) <input type="checkbox"/> YES 4 pts <input checked="" type="checkbox"/> NO 0 pts		0
D1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): <input checked="" type="checkbox"/> Wetland has persistent, ungrazed, vegetation in >95% of the area 5 pts <input type="checkbox"/> Wetland has persistent, ungrazed, vegetation in $\geq \frac{1}{2}$ of the area 3 pts <input type="checkbox"/> Wetland has persistent, ungrazed, vegetation in $\geq \frac{1}{10}$ of the area 1 pt <input type="checkbox"/> Wetland has persistent, ungrazed, vegetation in < $\frac{1}{10}$ of the area 0 pts		5
D1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of the wetland unit that is ponded for at least two months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition five out of 10 years.</i> <input checked="" type="checkbox"/> Area seasonally ponded is > $\frac{1}{2}$ total area of the wetland 4 pts <input type="checkbox"/> Area seasonally ponded is > $\frac{1}{4}$ total area of the wetland 2 pts <input type="checkbox"/> Area seasonally ponded is < $\frac{1}{4}$ total area of the wetland 0 pts		4
Total for D1 <i>Add the points in the boxes above</i>		11
D2 Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce quality in streams, lakes, or groundwater down gradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants, A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i>		Multiplier = 2
<input checked="" type="checkbox"/> Grazing in the wetland or within 150 feet <input type="checkbox"/> Untreated stormwater discharges to the wetland <input checked="" type="checkbox"/> Tilled fields or orchards within 150 feet of the wetland <input type="checkbox"/> A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging <input type="checkbox"/> Residential, urban areas, or golf courses are within 150 feet of wetland <input type="checkbox"/> Wetland is fed by groundwater high in phosphorus or nitrogen <input type="checkbox"/> Other <div style="text-align: center;">YES = multiplier is 2 NO = multiplier is 1</div>		
Total- Water Quality Functions Multiply the score from D1 by D2 <i>Add the score to the table on page 1</i>		22

DEPRESSIONAL AND FLATS WETLANDS		Points
<p align="center">Hydrologic Functions</p> <p align="center">Indicators that wetland functions to reduce flooding and stream degradation.</p>		
D3 Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?		-----
<p>D3.1 Characteristics of surface water flows out of the wetland unit:</p> <p><input type="checkbox"/> Unit is a depression with no surface water leaving (no outlet) 4 pts</p> <p><input checked="" type="checkbox"/> Unit has an intermittently flowing, OR highly constricted permanently flowing outlet 2 pts</p> <p><input type="checkbox"/> Unit is flat depression (Q.7), or in the Flats class, with permanent surface outflow and no obvious natural outlet and/or outlet is a man-made ditch 1 pt</p> <p><i>(If ditch is not permanently flowing, treat unit as intermittently flowing)</i></p> <p><input type="checkbox"/> Unit has an un-constricted, or slightly constricted, surface outlet (<i>permanently flowing</i>) 0 pts</p>		2
<p>D3.2 Depth of Storage during wet periods</p> <p><i>Estimate the height of ponding above the bottom of the outlet. For units with no outlet, measure from the surface of permanent water or deepest part (if dry).</i></p> <p><input type="checkbox"/> Marks of ponding are 3 ft or more above the surface or bottom of outlet 7 pts</p> <p><input type="checkbox"/> The wetland is a headwater wetland 5 pts</p> <p><input type="checkbox"/> Marks of ponding between 2 ft to < 3 ft from the surface or bottom of outlet 5 pts</p> <p><input checked="" type="checkbox"/> Marks are at least 0.5 ft to < 2 ft from the surface or bottom of outlet 3 pts</p> <p><input type="checkbox"/> Unit is flat (yes to Q.2 or Q.7) but has small depressions on the surface that trap water 1 pt</p> <p><input type="checkbox"/> Marks of ponding less than 0.5 ft 0 pts</p>		3
<p>D3.3 Contribution of wetland unit to storage in the watershed</p> <p><i>Estimate the ratio of: the area of upstream basin contributing surface water to the wetland, to the area of the wetland unit itself.</i></p> <p><input type="checkbox"/> The area of the basin is less than 10 times the area of the unit 5 pts</p> <p><input checked="" type="checkbox"/> The area of the basin is 10 to 100 times the area of the unit 3 pts</p> <p><input type="checkbox"/> The area of the basin is more than 100 times the area of the unit 0 pt</p> <p><input type="checkbox"/> Entire unit is in the FLATS class 5 pts</p>		3
<p>Total for D3 <i>Add the points in the boxes above</i></p>		8
<p>D4 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?</p> <p>Answer YES if the wetland is in a location in the watershed where it provides flood storage, or reduction in water velocity; it helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows.</p> <p>Answer NO if the water coming into the wetland is controlled by a structure such as floodgate, tide gate, flap valve, reservoir, etc.; OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur.</p> <p><i>Note which of the following indicators of opportunity apply.</i></p> <p><input type="checkbox"/> Wetland is in a headwater of a river or stream that has flooding problems</p> <p><input checked="" type="checkbox"/> Wetland drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other</p> <p align="center">YES = multiplier is 2 NO = multiplier is 1</p>		<p>Multiplier</p> <p>=</p> <p>2</p>
<p><u>Total- Hydrologic Functions</u> Multiply the score from D3 by D4</p> <p align="right"><i>Add score to table on page 1</i></p>		16

HABITAT FUNCTIONS		Points								
Indicators that the wetland functions to provide important habitat										
H1 Does the wetland unit have the <u>potential</u> to provide habitat for many species?		-----								
H1.1 Vegetation structure Check the types of vegetation classes present (as defined in Cowardin) - Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres. <input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants <input checked="" type="checkbox"/> Scrub/shrub- areas where shrubs have >30% cover <input type="checkbox"/> Forested- areas where trees have >30% cover If the unit has a forested class, check if: <input type="checkbox"/> Forested areas have three out of five strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon Add the number of vegetation types that qualify. If you have: <table style="width: 100%; margin-top: 10px;"> <tr> <td style="text-align: right;">4 or more structures</td> <td style="text-align: right;">4 pts</td> </tr> <tr> <td style="text-align: right;">3 structures</td> <td style="text-align: right;">2 pts</td> </tr> <tr> <td style="text-align: right;">2 structures</td> <td style="text-align: right;">1 pt</td> </tr> <tr> <td style="text-align: right;">1 structure</td> <td style="text-align: right;">0 pts</td> </tr> </table>		4 or more structures	4 pts	3 structures	2 pts	2 structures	1 pt	1 structure	0 pts	1
4 or more structures	4 pts									
3 structures	2 pts									
2 structures	1 pt									
1 structure	0 pts									
H1.2 Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. <input type="checkbox"/> Permanently flooded or inundated 4 or more present 3 pts <input checked="" type="checkbox"/> Seasonally flooded or inundated 3 present 2 pts <input type="checkbox"/> Occasionally flooded or inundated 2 present 1 pt <input checked="" type="checkbox"/> Saturated only 1 present 0 pts <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland 2 pts <input type="checkbox"/> Freshwater tidal wetland 2 pts		1								
H1.3 Richness of Plant Species Count the number of plant species in the wetland that cover at least 10 square feet. (Different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasian Milfoil, reed canary grass, purple loosestrife, or Canadian thistle Number of Species Counted: <input type="checkbox"/> >19 species 2 pts <input checked="" type="checkbox"/> 5-19 species 1 pt <input type="checkbox"/> <5 species 0 pts List of species counted (not required):		1								

<p>H1.4 Interspersion of Habitats Decide from the diagrams below, whether interspersion between Cowardin vegetation classes (described in H1.1), or the classes and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p style="text-align: center;">Moderate = 2 points</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  <p>(Riparian braided channels)</p> </div> </div> <p style="text-align: center;">High = 3 points</p> <p>NOTE: If you have four or more classes or three vegetation classes and open water, the rating is always "high".</p>	1
<p>H1.5 Special Habitat Features Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the points column.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Large, downed, woody debris within the wetland (>4 inches diameter and 6ft long) <input type="checkbox"/> Standing snags in the wetland (diameter at bottom >4 inches) <input type="checkbox"/> Undercut banks are present for at least 6.6ft (2m) and/or overhanging vegetation which extends at least 3.3ft (1m) over a stream for at least 33 ft (10m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present <input checked="" type="checkbox"/> At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in area that are permanently or seasonally inundated (structures for egg-laying by amphibians) <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants 	1
<p>H1. Total Score -- potential for providing habitat <i>Add the scores in all H1 columns above</i></p>	5

Comments:

H2. Does the wetland unit have the <u>opportunity</u> to provide habitat for many species?	Points
<p>H2.1 Buffers</p> <p><i>Choose the description that best represents the condition of the buffer of the wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."</i></p> <p><input type="checkbox"/> 100m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. No structures are within undisturbed part of buffer. (Relatively undisturbed also means no-grazing, no landscaping, no daily human use.) 5 pts</p> <p><input type="checkbox"/> 100m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >50% circumference. 4 pts</p> <p><input type="checkbox"/> 50m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. 4 pts</p> <p><input type="checkbox"/> 100m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >25% circumference. 3 pts</p> <p><input type="checkbox"/> 50m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >50% circumference. 3 pts</p> <p style="text-align: center;">If the buffer does not meet any of the above criteria</p> <p><input type="checkbox"/> No paved areas (except paved trails) or buildings within 25m (80ft) of wetland >95% circumference. Light to moderate grazing, or lawns are OK. 2 pts</p> <p><input checked="" type="checkbox"/> No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. 2 pts</p> <p><input type="checkbox"/> Heavy grazing in the buffer. 1 pt</p> <p><input type="checkbox"/> Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). 0 pts</p> <p><input type="checkbox"/> Buffer does not meet any of the criteria above. 1 pt</p>	2
<p>H2.2 Corridors and Connections</p> <p>H2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150ft wide, has at least 30% cover of shrubs, forest, or native undisturbed prairie, that connects to estuaries, other wetlands, or undisturbed uplands that are at least 250 acres in size? Dams in riparian corridors, heavily used gravel roads, and paved roads are considered breaks in the corridor.</p> <p style="text-align: center;">YES = 4 points (go to question H 2.3) NO = go to question H2.2.2</p> <p>H2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands, or undisturbed uplands that are at least 25 acres in size? OR a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above.</p> <p style="text-align: center;">YES = 2 points (go to question H2.3) NO = go to question H2.2.3.</p> <p>H2.2.3 Is the wetland:</p> <p><input checked="" type="checkbox"/> within five miles (8km) of a brackish or salt water estuary OR</p> <p><input type="checkbox"/> within three miles of a large field or pasture (>40 acres) OR</p> <p><input type="checkbox"/> within one mile of a lake greater than 20 acres?</p> <p style="text-align: center;">YES = 1 point NO = 0 points</p>	1

H2.4 Wetland Landscape (see p.85)		Points
Choose the one description of the landscape around the wetland that best fits.		3
<input type="checkbox"/>	There are at least three other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, field, or other development). 5 pts	
<input type="checkbox"/>	The wetland is Lake-fringe on a lake with little disturbance and there are three other lake-fringe wetlands within ½ mile. 5 pts	
<input checked="" type="checkbox"/>	There are at least three other wetlands with in ½ mile, BUT the connection between them is disturbed. 3 pts	
<input type="checkbox"/>	The wetland is Lake-fringe on a lake WITH disturbance and there are three other lake-fringe wetlands within ½ mile. 3 pts	
<input type="checkbox"/>	There is at least one other wetland within ½ mile. 2 pts	
<input type="checkbox"/>	There are no other wetlands within ½ mile. 0 pts	
H2. Total Score - opportunity to provide habitat		6
Add the scores in all of the H2 columns above		
Total for H1		5
Total Score for Habitat Functions-		11
Add the points from the total H1 and H2 boxes Add the score to table on page 1		

WETLAND DETERMINATION DATA FORM - Western Mountain, Valley Coast Region

Project Site: 4523 Haxton Way	City/County: Whatcom	Sample Date: 1/31/12
Applicant/Owner:	State: WA	Sample Point: 2012-3-2
Investigator: Analiese Burns & Michele Bodtke	Section/Township/Range: Sec 1&12, T38N R1E WM	
Landform (hillslope, terrace, etc): floodplain	Local Relief (concave, convex, none) : none	Subregion: LRR A
Soil Map Unit Name: Eliza silt loam	NWI Classification:	
Are climatic/hydrologic conditions on the site typical of this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Remarks)		
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? (If needed, explain any answers in Remarks.)		

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: Upland . Positive Indicators for all three parameters were not observed at this location.	

VEGETATION

Tree Stratum (Plot size: 9 meters)	Absolute % Cover	Indicator Status	Dominant Species?	Dominance Test worksheet Number of Dominant Species that are OBL, FACW, or FAC:	
		-	<input type="checkbox"/>		1
		-	<input type="checkbox"/>		(A)
		-	<input type="checkbox"/>		1
Total Cover:				Total number of dominant species across all strata:	(AB)
Sapling/Shrub Stratum (Plot size: 3 meters)				Percent of dominant species that are OBL, FACW, FAC:	100
		-	<input type="checkbox"/>		(A/AB)
		-	<input type="checkbox"/>		
		-	<input type="checkbox"/>	Prevalence Index worksheet	
		-	<input type="checkbox"/>	OBL species:	x 1=
		-	<input type="checkbox"/>	FACW species:	x 2=
Total Cover:				FAC species:	x 3=
Herb Stratum (Plot size: 1 meter)				FACU species:	x 4=
<i>Phalaris arundinacea</i>	40	FACW	<input checked="" type="checkbox"/>	UPL species:	x 5=
<i>Trifolium repens</i>	15	FAC	<input type="checkbox"/>	Total:	(A) (B)
<i>Festuca rubra</i>	20	FAC+	<input type="checkbox"/>	Prevalence Index = B/A =	
<i>Agrostis sp.</i>	15	FAC	<input type="checkbox"/>	Hydrophytic Vegetation Indicators:	
<i>Festuca sp.</i>	20	-	<input type="checkbox"/>	<input checked="" type="checkbox"/> Dominance Test is > 50%	
<i>Taraxacum officinale</i>	TR	FACU	<input type="checkbox"/>	<input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹	
Total Cover:	110			<input type="checkbox"/> Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
Woody Vine Stratum (Plot size:)				<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
		-	<input type="checkbox"/>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹	
		-	<input type="checkbox"/>	¹ Indicators of hydric soil and wetland hydrology must be present.	
		-	<input type="checkbox"/>		
Total Cover:					
% Bare Ground in Herb Stratum: 10					
Remarks: The majority of dominant species observed at this location were hydrophytic.				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

SOIL

Sample Point: 2012-3-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Soil Color		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-11	10 YR 3/1	97	10 YR 3/3	3	C	RC	silt loam	
11-20+	2.5 Y 3/1	90	10 YR 4/4	10	C	RC	silt loam	charcoal observed
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		

¹Type: C=concentration D=depletion RM=reduced matrix ²Location: PL=pore lining RC=root channel M=matrix

Hydric Soil Indicators: (applicable to all LRRs unless otherwise noted)				Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)		<input type="checkbox"/> Red parent material (TF2)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Very shallow dark surface (TF12)		<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)				
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)				
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)				
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)				
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)				
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (FB)				

³Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Depth (Inches):	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Soil observed at this location did not meet NRCS hydric soil indicators. Area appears to be old fill material.	

HYDROLOGY

Wetland hydrology indicators: Primary Indicators (any one indicator is sufficient)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Water-stained Leaves (B9) (except MLRA 1, 2, 4A and 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along living roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stresses Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Water-stained (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Front-heave Hummocks (D7) <input type="checkbox"/> FAC-neutral (D5)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (Inches): Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (Inches): Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (Inches): (include capillary fringe)		Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Positive indicators of wetland hydrology were not observed at this location, soil was dry to 20 ". Sample taken -20 feet east of wetland sample point.		

WETLAND DETERMINATION DATA FORM - Western Mountain, Valley Coast Region

Project Site: 4523 Haxton Way	City/County: Whatcom	Sample Date: 1/31/12
Applicant/Owner:	State: WA	Sample Point: 2012-3-1
Investigator: Analese Burns & Michele Bodtke	Section/Township/Range: Sec 1&12, T38N R1E WM	
Landform (hillslope, terrace, etc): floodplain	Local Relief (concave, convex, none) : none	Subregion: LRR A
Soil Map Unit Name: Eliza silt loam	NWI Classification:	
Are climatic/hydrologic conditions on the site typical of this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Remarks)		
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? (If needed, explain any answers in Remarks.)		

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: Wetland 2012-3. Positive Indicators for all three parameters were observed at this location. Sample taken just east of topo break, probably edge of old fill.	

VEGETATION

Tree Stratum (Plot size: 9 meters)	Absolute % Cover	Indicator Status	Dominant Species?	Dominance Test worksheet Number of Dominant Species that are OBL, FACW, or FAC:	
		-	<input type="checkbox"/>		1
		-	<input type="checkbox"/>		(A)
		-	<input type="checkbox"/>		
		-	<input type="checkbox"/>	Total number of dominant species across all strata:	1 (AB)
Total Cover:					
Sapling/Shrub Stratum (Plot size: 3 meters)				Percent of dominant species that are OBL, FACW, FAC:	
		-	<input type="checkbox"/>		100
		-	<input type="checkbox"/>		(A/AB)
		-	<input type="checkbox"/>		
		-	<input type="checkbox"/>	Prevalence Index worksheet	
		-	<input type="checkbox"/>	OBL species:	x 1=
		-	<input type="checkbox"/>	FACW species:	x 2=
Total Cover:				FAC species:	x 3=
Herb Stratum (Plot size: 1 meter)				FACU species:	x 4=
<i>Phalaris arundinacea</i>	90	FACW	<input checked="" type="checkbox"/>	UPL species:	x 5=
<i>Agrostis sp.</i>	10	FAC	<input type="checkbox"/>	Total:	(A) (B)
		-	<input type="checkbox"/>	Prevalence Index = B/A =	
		-	<input type="checkbox"/>	Hydrophytic Vegetation Indicators:	
		-	<input type="checkbox"/>	<input checked="" type="checkbox"/> Dominance Test is > 50%	
		-	<input type="checkbox"/>	<input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹	
Total Cover:	100			<input type="checkbox"/> Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
Woody Vine Stratum (Plot size:)				<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
		-	<input type="checkbox"/>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹	
		-	<input type="checkbox"/>	¹ Indicators of hydric soil and wetland hydrology must be present.	
Total Cover:					
% Bare Ground in Herb Stratum:					
Remarks: The majority of dominant species observed at this location were hydrophytic.				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

SOIL

Sample Point: 2012-3-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Soil Color		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10 YR 3/1	93	7.5 YR 3/4	7	C	RC	silt loam	
6-20+	10 YR 5/1	70	10 YR 4/4	20	C	M	silt loam	
			7.5 YR 3/4	10	C	RC		
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		

¹Type: C=concentration D=depletion RM=reduced matrix ²Location: PL=pore lining RC=root channel M=matrix

Hydric Soil Indicators: (applicable to all LRRs unless otherwise noted)

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)

- ☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
☐ Red parent material (TF2)
☐ Very shallow dark surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks: Soil observed at this location met NRCS hydric soil indicators. Area may be old fill material.

HYDROLOGY

Wetland hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)

- ☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-stained Leaves (B9) (except MLRA 1, 2, 4A and 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along living roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained (B9) (MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ Front-heave Hummocks (D7)
☐ FAC-neutral (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (Inches):Water Table Present? Yes ☒ No ☐ Depth (Inches): 10"Saturation Present? Yes ☒ No ☐ Depth (inches): 7" (include capillary fringe)

Wetland Hydrology Present?

Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Positive indicators of wetland hydrology were observed at this location.

WETLAND DETERMINATION DATA FORM - Western Mountain, Valley Coast Region

Project Site: 4523 Haxton Way / S. Red River Road	City/County: Whatcom	Sample Date: 1/31/12
Applicant/Owner:	State: WA	Sample Point: 2012-3-3
Investigator: Analiese Burns & Michele Bodtke	Section/Township/Range: Sec 1&12, T38N R1E WM	
Landform (hillslope, terrace, etc): floodplain	Local Relief (concave, convex, none) : none	Subregion: LRR A
Soil Map Unit Name: Eliza silt loam	NWI Classification:	
Are climatic/hydrologic conditions on the site typical of this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Remarks)		
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?		Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?		(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: Upland . Positive Indicators for all three parameters were not observed at this location.	

VEGETATION

Tree Stratum (Plot size: 9 meters)	Absolute % Cover	Indicator Status	Dominant Species?	Dominance Test worksheet Number of Dominant Species that are OBL, FACW, or FAC:	
		-	<input type="checkbox"/>		1
		-	<input type="checkbox"/>		(A)
		-	<input type="checkbox"/>	Total number of dominant species across all strata:	1
Total Cover:					(AB)
Sapling/Shrub Stratum (Plot size: 3 meters)				Percent of dominant species that are OBL, FACW, FAC:	100
		-	<input type="checkbox"/>		(A/AB)
		-	<input type="checkbox"/>		
		-	<input type="checkbox"/>	Prevalence Index worksheet	
		-	<input type="checkbox"/>	OBL species:	x 1=
		-	<input type="checkbox"/>	FACW species:	x 2=
Total Cover:				FAC species:	x 3=
Herb Stratum (Plot size: 1 meter)				FACU species:	x 4=
<i>Festuca arundinacea</i>	90	FAC-	<input checked="" type="checkbox"/>	UPL species:	x 5=
<i>Trifolium repens</i>	10	FAC	<input type="checkbox"/>	Total:	(A) (B)
		-	<input type="checkbox"/>	Prevalence Index = B/A =	
		-	<input type="checkbox"/>	Hydrophytic Vegetation Indicators:	
		-	<input type="checkbox"/>	<input checked="" type="checkbox"/> Dominance Test is > 50%	
		-	<input type="checkbox"/>	<input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹	
Total Cover:	100			<input type="checkbox"/> Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
Woody Vine Stratum (Plot size:)				<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
		-	<input type="checkbox"/>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹	
		-	<input type="checkbox"/>	¹ Indicators of hydric soil and wetland hydrology must be present.	
Total Cover:					
% Bare Ground in Herb Stratum:					
Remarks: The majority of dominant species observed at this location were hydrophytic.				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

SOIL

Sample Point: 2012-3-3

Profile Description: (Describe to the depth needed to document the Indicator or confirm the absence of Indicators.)

Depth (Inches)	Soil Color		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-13	10 YR 3/2	100			-	-	silt loam	
13-20+	10YR 4/1	60	10 YR 4/4	40	C	RC	silt loam	
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		

¹Type: C=concentration D=depletion RM=reduced matrix ²Location: PL=pore lining RC=root channel M=matrix

Hydric Soil Indicators: (applicable to all LRRs unless otherwise noted)

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)

- ☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
☐ Red parent material (TF2)
☐ Very shallow dark surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soil Present? Yes ☐ No ☒

Remarks: Soil observed at this location did not meet NRCS hydric soil indicators.

HYDROLOGY

Wetland hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)

- ☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-stained Leaves (B9) (except MLRA 1, 2, 4A and 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along living roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained (B9) (MLRA 1,2,4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ Front-heave Hummocks (D7)
☐ FAC-neutral (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (Inches):Water Table Present? Yes ☐ No ☒ Depth (inches):Saturation Present? Yes ☐ No ☒ Depth (inches): (include capillary fringe)

Wetland Hydrology Present?

Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Positive indicators of wetland hydrology were not observed at this location, soil was dry to 20 ". Sample -two feet higher than wetland.



Eastern edge of wetland as looking west
from 4523 Haxton Way.



Eastern edge of wetland and buffer as looking
east toward 4523 Haxton Way.



Southern edge of wetland as looking
northeast from 4453 Haxton Way.

Wetland 2012-3, 1/31/12
SW corner of Red River Road and Haxton Way